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10/564,161	02/21/2006	Philip Von Schroeter	05168	6118

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EXAMINER
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ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,161	VON SCHROETER ET AL.	
	Examiner	Art Unit	
	TIZE MA	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6,8-11,15,19,20,22 and 24-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6,8-11,15,19-20,22,24-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 4/29/2009 have been fully considered but they are not persuasive.

2. Before answering the specific arguments of applicant, the examiner would like to list the basic guidelines for judging the patentability of the claimed features. This would help both the applicant and the examiner to understand the positions of each other. First, when displaying an object in a coordinate system, choice of axes relative to the object is not considered as a patentable feature. That is, if a system allows a user to position the object in the coordinate anywhere he or she want, or to align the object any way he or she want, then different positions or alignments of the object relative to the coordinate, e.g., its origin or axes are not considered as different features, because it would have been obvious to one of ordinary skill in the art to change the positions or the alignments. Second, naming the axes differently is not considered as different coordinate system. A spherical coordinate system is considered as different from a Cartesian coordinate system. However, two Cartesian coordinate systems are considered as the same even though their axes are named differently. Third, restricting the degrees of freedom as manipulating the virtual object is not considered as a patentable feature. Specifically, if claim A allows 3 degrees of freedom, and claim B allows two degrees of freedom, then claim B is considered as obvious over A. The reason is, extending to more degrees of freedom usually requires significant effort. While for reducing or restricting the degrees of freedom, one can choose not to use the

degrees of freedom that are considered as unnecessary. Disabling the extra degrees of the freedom by hardware or software means is also obvious choices to one of ordinary skill in the computer art.

3. Regarding the new claim 24, which is replacing original claim 1, the applicant argues that,

(1) Actually, the closest of these two patent would appear to be Kopelman since the invention in the present application relates to a method for displaying on a monitor a dental technical object.

(2) Shibata is not concerned with a method for displaying an object on a monitor but rather to a three-dimensional data input device. According to this disclosure (column 6, line 36 through column 7, line 25), three-dimensional data input is provided such that use of a mouse 3 permits the movement of an object to be displayed on a monitor to a total of six degrees of freedom. The data input device or mouse is so designed such that there is a possibility to move an object translatory along the X, Y, and Z axes (column 7, lines 4-12). Zooming is performed when moving along the Y axis.

Additionally, it is possible to rotate an object to be displayed on a monitor around the X, Y, and Z axes (column 6, lines 48, 59, and column 7, line2).

Shibata is typical of the state of the art previously used in connection with 3D-CAD systems. It certainly does not teach any relationship with dental technology and it is also silent with regard to the restriction of the display of the object such that the same can be moved to a maximum of five degrees of freedom as provided by this invention.

(3) New claim 24 replaces original claim 1 and defines the degrees of freedom clearly, namely, a rotation about the Z- axis, a translation along the X-axis, and a translation and rotation about an additional axis (T-axis) running in the X/Y plane and beginning at the origin of the coordinate system.

Insofar, it is mandatory that the dental technical article to be displayed is aligned along the T-axis. This is not disclosed by Shibata. Movement to only five degrees of freedom is not possible in Shibata, nor is an additional axis provided, relative to which the object to be displayed is aligned, (the additional axis must pass through the object to be displayed. Shibata allows aligning the object relative to each axis, i.e. it is not mandatory for the object to be passed through by an axis.

In our disclosure, rotation about the X-axis provides the 5th degree of freedom and said X-axis corresponds to the Y-axis in Shibata.

(4) The present method and that taught by Shibata are totally different with respect to displaying an object on a monitor. There is no teaching or suggestion of displaying a dental technical object. Display of such an article is shown by Kopelman. The dental technical object is shown in desired positions. For this purpose, stepwise rotation of the section of a jaw, for example, around the Y-and Z-axes lying in the plane of the monitor is possible. Zooming the object along the X-axis is possible. However, restriction of the movement relative to the number of degrees of freedom does not result. In addition, no hint can be found in this patent to align the dental technical object along the axis running in a plane defined by both X- and Y- axes. Consequently, the further features

set forth in Claim 24, namely, rotation and movement about and along, respectively, the T-axis cannot be anticipated pf suggested by Kopelman.

4. The examiner disagrees. Regarding point (1), Kopelman does appear closer to the instant application due to the same purpose of the invention. However, Shibata discloses all features of the method in the instant claim except that Shibata applies to general objects, while Kopelman applies specifically to dental object as in the instant claim. The functionality weighs more than the purpose of the application. Regarding point (2), although Shibata focuses more on the 3D data input device, as stated by the applicant, all operations, e.g., rotation, translation, and rooming of the an object are displayed on the monitor (Fig. 3A). Shibata allows six degrees of freedom, while the instant claim allows five. Restricting one degree of freedom is considered as an obvious variance, see the guideline above. Regarding point (3), although Shibata may names the axes of the coordinates differently, aligning and positioning the object differently compared to that in the instant claim. Again, this is considered as obvious. The T-axis in the instant claim would be the same the new Y-axis in Shibata after a rotation about z-axis. Regarding point (4), as shown in points (2) and (3), restricting degrees of freedom, aligning and positioning the object differently are considered as obvious variations. And Kopelman applies technique specifically to dental object as in the instant claim. In summary, the combination of Shibata and Kopelman renders the claim 24 obvious to one of ordinary skill in the art at the time of the invention. Claim 24 is rejected.

5. Regarding the independent claim 19, the amended claim is now rejected under 35 U.S.C. 103(a) as being unpatentable over Kopelman et al, in view of Rubbert et al

(US. Pub. 2002/0010568 A1), and Shibata et al. Kopelman et al teaches all features in the claim except for computing the virtual dental prosthesis and manufacturing the actual prosthesis, and movement to a maximum of five degrees of freedom. Rubbert et al teaches computing the virtual dental prosthesis and manufacturing the actual prosthesis (paragraphs [0014] and [0065]). Shibata et al teaches up to six degrees of freedom. The combination of Kopelman, Rubbert et al, and Shibata renders the claim 19 obvious to one of ordinary skill in the art at the time of the invention.

6. The dependent claims of claims 24 and 19 are also rejected based on the similar rationale as in claims 24 and 19.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 24, 2-6, 8-11, 25-28, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata et al (US. 6,466,831 B1), and in view of Kopelman et al (US. 6,664,986 B1, already of record).

10. Regarding claim 24, Shibata et al teaches a method for displaying a digitized technical object on a monitor, utilizing a right-angled coordinate system with X, Y and Z axes (Fig. 5A, x,y,z coordinates), whereby the Z-axis and the Y-axis and the intersection or origin of the coordinate system, of the axes in the image plane of the monitor and the X-axis run perpendicular to the image plane and the technical object is rotated about two axes running perpendicular to each other and is shifted along the X-axis for zooming the object (Fig. 5A-5C, axes perpendicular to each other, rotations; Fig. 5D, zooming);

The improvement comprising, the technical object is aligned along a T-axis running in a plane defined by the X-axis and the Y-axis and passing through the origin of the coordinate and is moved to a maximum of five degrees of freedom, whereby a rotation (Rot_z) about the Z-axis is chosen as the first degree of freedom, a rotation (Rot_t) about the T-axis is chosen as the second degree of freedom, a translation of the object along the T-axis is chosen as the third degree of freedom and the translation of the object along the X-axis is chosen as the fourth degree of freedom (column 6, line 36-column 7, line 25, various rotations and translations, totally six degrees of freedom. One of degrees of freedom can be ignored to match the five degrees of freedom. The T-axis in the instant claim would be the same the new Y-axis in Shibata after a rotation about z-axis).

11. However, Shibata et al does not teach that the object is a dental object, such as a dental prosthesis or a model of at least one tooth or of an area of the jaw to be provided with a dental prosthesis.

12. Kopelman et al teaches modeling 3D dental objects (abstract, Fig. 1 and 3) using computers. The computer implemented 3D modeling provides a graphical view without creating the actual object.

13. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Shibata et al and Kopelman et al to model dental object in 3D for the benefit of graphical view of the object without creating the actual object.

14. Regarding claim 2, Shibata et al teaches a method according to claim 24, wherein the technical dental object is moved to a maximum of the first, second, third and fourth degrees of freedom (column 6, lines 24-35, totally six degrees of freedom, any one or combinations of the six would result in the first to fourth degrees of freedom).

15. Regarding claim 3, Shibata et al teaches a method according to claim 24, wherein a fifth degree of freedom, a rotation (Rot_x) of the object around the X-axis is chosen (Fig. 5C, rotation around x-axis).

16. Regarding claim 4, Shibata et al teaches a method according to claim 24, wherein the technical dental object is rotated at an angle α about the T-axis, and wherein $\alpha<360^{o}$, and preferably $\alpha \leq 180^{o}$ (Rotation as in Fig. 3A, then rotation as in Fig. 3B choosing the new y axis as T-axis).

17. Regarding claim 5, Shibata et al does not explicitly teaches a method according to claim 24, wherein the technical dental object is displayed on the monitor in such a

way that the technical dental object is independent of its movement or presentation is passed through by the origin of the coordinate system. However, it would have been well known that the technical object can be independent of its movement or presentation is passed through by the origin of the coordinate system.

18. Claim 6 describes how to choose the coordinates for the object, and the alignments of the axes. They are all up to the choices of the users.

19. Claims 8-11 describe how to position the object in the coordinates. They are all up to the choices of the users.

20. Claim 25 describes how to position the object in the coordinates, and the alignments of the axes. They are all up to the choices of the users.

21. Regarding claim 26, Shibata et al teaches a method according to claim 24, wherein an input device is employed for aligning the object on the monitor, said input device having input elements by which the alignment of the object is carried out at the respective degrees of freedom independent of each other (column 6, lines 39-67. Mouse, rotations by using mouse).

22. Regarding claim 27, Shibata et al teaches a method according to claim 26, wherein said input device has four input elements (Fig. 1, mouse; four input elements as switches 8 and 9, ball 4, body 3).

23. Regarding claim 28, Shibata et al teaches a method according to claim 26, wherein a changeover switch is used for one of said input elements (Fig. 1, mouse; column 6, lines 50-53, switch 9).

24. Regarding claim 31, Shibata et al teaches a method according to claim 26, wherein the technical object is moved in a restricted manner by the optional operation of individual input elements as well as combined operation of two input elements around four degrees of freedom (column 6, line 39-column 7, line 25, individual or combined operations of input elements).

25. Claims 15, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata et al, and in view of Kopelman et al, as applied to claims 24 and 26 above, and further in view of Wang (US. Pub. 2002/0060663 A1).

26. Regarding claims 15, and 29-30, the combination of Shibata et al and Kopelman et al remains as applied to claims 24 and 26 above. However, the combination does not teach wherein an adjusting wheel is used as one or several input elements; wherein said input device is a trackball that functions for at least two of said input elements; and wherein, when said trackball is used as one of the input elements, the dental technical object is rotated about the first and second axes as well as about an axis running perpendicular to this axis by analogous rotation of the trackball.

27. Wang teaches an input device which has input elements of an adjusting wheel and a trackball (Fig. 11, 198, 104). These additional input elements provide the ability or convenience of direct manipulations of 3-D objects or movements for some applications (paragraph [0012]).

28. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the input device used in the combination of the procedures in Shibata et al and Kopelman et al to include an adjusting wheel and a trackball as shown

in Wang to perform some of the movements for convenience of direct manipulations of 3-D objects.

29. Claims 19-20, 22, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kopelman et al, and in view of Rubbert et al (US. Pub. 2002/0010568 A1), and further in view of Shibata et al.

30. Regarding claim 19. Kopelman et al teaches a method for displaying digital dental prosthesis on the basis of digitized data of a jaw area to be provided with the dental prosthesis (Figs. 2 and 3), displaying at least the dental prosthesis on a monitor (Fig. 2, and column 2, lines 65-67), evaluating the displayed dental prosthesis by moving the dental prosthesis on the monitor in various degrees of freedom (Figs 2 and 3).

31. However, Kopelman et al does not explicitly teach computing the dental prosthesis based on the digitized data, a maximum of five degrees of freedom, and , if necessary, modifying the displayed dental prosthesis and the subsequent manufacture of the dental prosthesis on the basis of the data that correspond to the displayed dental prosthesis .

32. Rubbert et al, in the same field of endeavor, teaches computing the dental prosthesis based on the digitized data (e.g., paragraph [0017], designing and calculating archform), and, if necessary, modifying the displayed dental prosthesis (e.g., paragraph [0018], changing position of virtual brackets and teeth) and the subsequent manufacture of the dental prosthesis on the basis of the data that correspond to the displayed dental prosthesis (paragraph [0065], customized orthodontic archwire based

on the virtual model is manufactured.). Rubbert et al provides an interactive treatment planning and service system. In addition, Shibata et al teaches a fully 3D manipulation of the virtual object in six degrees of freedom, which is fully capable of operating in five degrees of freedom.

33. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the methods as shown in Kopelman et al, Rubbert et al, and Shibata et al by computing the dental prosthesis based on the digitized data, manipulating displayed in five degrees of freedom and modifying the object if necessary, and manufacturing the dental prosthesis for the benefit of an interactive dental treatment planning and services.

34. Regarding claim 20, Kopelman et al teaches a method according to claim 19, wherein the dental prosthesis and the jaw area to be provided with the dental prosthesis are displayed on the monitor (Fig. 2, the model of artificial denture on the monitor).

35. Regarding claim 22, Rubbert et al teaches a method according to claim 19, wherein the dental prosthesis displayed on the monitor is modeled by electronic modification of the data (Paragraph [0106], when changing any parameter, the change is immediately reflected in the view of the model of the dentition).

36. Regarding claim 32, Rubbert et al teaches a method according to claim 19, wherein the digitized data of the jaw area to be provided with the dental prosthesis, that is taken as a basis for computing the dental prosthesis, is linked with stored parameters such as wall thickness of the dental prosthesis or the cement gap between the dental prosthesis and the jaw area and that from data so attained, the dental prosthesis is

computed and displayed on the monitor (paragraph [0065], obtaining the three-dimensional digital data of the patient's teeth from the scanning node and displaying the model.)

37. Regarding claim 33, Kopelman et al teaches a method according to claim 19, wherein the dental prosthesis and/or jaw area are moved on the monitor to a maximum of four degrees of freedom (Figs. 2 and 3: Operations in four degrees of freedom: (1) elevating or translating along z axis, (2) rotating about z axis, (3) zooming, which is like moving toward or away from the viewer, (4) opening or closing the jaw.).

Conclusion

38. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIZE MA whose telephone number is (571)270-3709. The examiner can normally be reached on Mon-Fri 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao M. Wu can be reached on 571-272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

tm

/XIAO M. WU/

Supervisory Patent Examiner, Art Unit 2628